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Evaluation of New Canal Point Sugarcane Clones

1996–97 Harvest Season

ABSTRACT

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Twenty-seven replicated experiments were conducted on 9 farms (representing 7 soils—Dania, Lauderhill, Pahokee, Terra Ceia, and Torry mucks; and Pompano fine sand and Malabar sand) to evaluate 46 new Canal Point (CP) clones of sugarcane (11 in the CP 92 series, 12 in the CP 91 series, 12 in the CP 90 series, and 11 in the CP 89 series). Seven farms had organic (muck) soils, and two had sand soils. Experiments compared the cane and sugar yields of the new clones, complex hybrids of *Saccharum* spp., with yields of CP 70–1133, a widely grown commercial cultivar in Florida. Each clone was rated for its susceptibility to diseases.

CP 92–1435 yielded significantly more kilograms of sugar per metric ton of cane (KS/T), metric tons of cane per hectare (TC/H), and metric tons of sugar per hectare (TS/H) than CP 70–1133 in the tests of the CP 92 series averaged across six plant-cane locations. CP 92–1666, CP 92–1167, and CP 92–1641 yielded significantly more TS/H than CP 70–1133 in the plant-cane experiments of the CP 92 series. No CP 91 clone, either as plant cane or as first-ratoon cane, yielded significantly more TS/H than CP 70–1133.

CP 90–1436, CP 90–1464, and CP 90–1222 yielded significantly more TS/H than CP 70–1133 in the tests of the CP 90 series in first-ratoon cane. CP 90–1222 also yielded significantly more TS/H than CP 70–1133 in the second-ratoon tests of the CP 90 series. CP 90–1222 also was the only clone to yield significantly more TS/H than CP 70–1133 for all CP 90 plant-cane, first-ratoon, and second-ratoon tests combined. No clone in the CP 89 series in the second-ratoon experiment yielded significantly more TS/H than CP 70–1133.

The audience for this publication includes geneticists, researchers, growers, extension agents, and individuals in industry who are interested in sugarcane clone development.

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Keywords: Histosol, muck soil, organic soil, *Puccinia melanocephala, Saccharum* spp., stability-safety index, sugarcane cultivars, sugarcane rust, sugarcane smut, sugarcane yields, sugar yields, *Ustilago scitaminea*.

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CONTENTS

EVALUATION OF NEW CANAL POINT SUGARCANE CLONES

1996–97 Harvest Season

B. Glaz, P.Y.P. Tai, J.C. Comstock, and J.D. Miller

Clonal selection at precommercial stages is one of the major components in the successful commercial production of sugarcane, complex hybrids of *Saccharum* spp. Although production of sugar per unit area is a very important characteristic, it is not the only factor on which sugarcane is evaluated. In addition, analyses are made on the quantity of cane needed to produce a particular sugar yield and on the fiber content of the cane. The time of year and the duration that a clone yields its highest amount of sugar per unit area can be very important, since sugarcane harvest seasons extend from fall to spring. Because sugarcane is commercially grown in plant and ratoon crops, clones are evaluated accordingly. Adaptability to mechanical harvesting is a trait that has recently become important in Florida.

Information about the stability of a clone's performance across environments aids in selecting clones that will yield well across all environments. Stability measurements also enable identification of clones that will perform well in some but not all environments. This stability factor is important in our evaluations because of the wide range of environments for growing sugarcane in Florida. As differences in such characteristics as temperature, moisture, and soil widen, more location-specific clones become necessary because few clones produce high yields in markedly different environments.

Clones with desired agronomic characteristics also must be productive in the presence of harmful diseases, insects, and weeds. Some pests rapidly develop new, virulent races or strains. Clonal resistance to such pathogens often changes over time, so no clone can be considered permanently resistant. The selection team must try not to discard clones that have sufficient resistance or tolerance to pests, but it also must discard clones that are too susceptible to pests to be grown commercially. Sugarcane growers in Florida rely much more on tolerance than resistance to sugarcane diseases.

In the 1996 growing season, the top six cultivars comprised 72.2 percent of the total Florida sugarcane hectarage (Glaz 1996). Each of these six cultivars, CP 80–1827, CP 72–2086, CL 61–620, CP 80–1743, CP 73–1547, and CP 70–1133, was susceptible to sugarcane rust, mosaic, or leaf scald. Glaz et al. (1986) presented a formula and procedure to help growers distribute their available sugarcane cultivars while considering possible attacks of new pests.

The disease that has caused the most difficulty in Florida in selecting resistant sugarcane cultivars has been sugarcane rust, caused by *Puccinia melanocephala* Syd & P. Syd. The disease against which Florida sugarcane growers and scientists have had the most success in selecting resistant cultivars has been sugarcane smut, caused by *Ustilago scitaminea* Syd and P. Syd. Florida sugarcane growers added leaf scald, caused by *Xanthomonas albilineans* (Ashby) Dow, to their list of major sugarcane diseases several years ago and more recently added yellow leaf syndrome, a disease caused by a luteovirus (Lockhart et al. 1996) and sugarcane mosaic virus. Probably ratoon stunt disease (RSD), caused by *Clavibacter xyli* subsp. *xyli*, has been the most damaging, although the least visible, sugarcane disease in Florida. Some growers minimize losses from RSD by using hot-water treatments to obtain disease-free seed cane. Scientists at Canal Point screen clones for resistance to rust, smut, leaf scald, mosaic, RSD, and eye spot, caused by *Bipolaris sacchari*. Eye spot is not currently a commercial problem in Florida.

Damaging insect pests in Florida of long duration are the sugarcane borer, *Diatraea saccharalis* (F.); the sugarcane wireworm, *Melanotus communis*; and the sugarcane grub, *Ligyrus subtropicus*. An insect discovered in Florida in 1990, the sugarcane lace bug, *Leptodictya tabida* (Hall 1991), has also become a pest, selectively feeding upon some clones. In 1994, another insect pest new to commercial sugarcane fields in Florida was found—the West Indian cane weevil, *Metamasius hemipterus* (L.) (Sosa 1995). In 1994, this weevil caused particularly severe damage to several plantings of CP 85–1382, a promising new clone described previously in this series of reports.

Scientists at Canal Point are working to incorporate borer resistance into the breeding program by selecting for leaf pubescence (a trait known to promote resistance) in elite sugarcane clones (Sosa 1996).

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Currently, there are no known commercial sugarcane cultivars with pubescent leaves.

A new emphasis for this Florida breeding program is to breed and select sugarcane cultivars that will enhance sugarcane's relationship with the surrounding Everglades. Two strategies that are currently part of Canal Point's program are to breed and select clones that will help reduce the phosphorus content of water discharged from Florida sugarcane farms and that will yield well in soils with higher water tables.

Each year at Canal Point, approximately 100,000 seedlings are evaluated from crosses derived from a diverse germplasm collection. (However, reports from Mangelsdorf (1983) and Deren (1995) contend that the genetic base of U.S. sugarcane breeding programs is too narrow.) This year most of the parental clones in the Canal Point program originated from Canal Point. In addition, clones used as parents this season came from Clewiston (Florida), Louisiana, and Texas, and from Colombia and Puerto Rico. Also, several feral *Saccharum officinarum* and *Saccharum robustum* clones and interspecific hybrids of these clones were used as parents.

About 1 percent of 100,000 seedlings from the seedling and stage I phases are selected over a 2-year period at Canal Point. The first year about 10 percent are visually selected, or 10,000 of the available seedlings, and vegetatively or clonally propagated. From this stage on in the selection program, all reproduction is vegetative; hence the clones used are genetically identical, assuming no mutations or the unlikely formation and germination of true seeds in our plots. The second year, about 10 percent of these 10,000 clones are visually selected. From these 1,000 selected clones in stage II, about 130 are selected for continued testing in replicated experiments for 2 years at 4 locations in stage III. The primary selection criteria for the groups of 1,000 and 131 clones are sugar yields, cane tonnage, and disease resistance.

The 10 or 11 most promising clones receive continued testing for 4 more years in the stage IV experiments reported in this annual publication. Tai and Miller (1989) also described this selection program from the seedling to the stage IV phase. Clones that successfully complete these experimental phases undergo 2–4 years of evaluation and seed-cane increase by the Florida Sugar Cane League, Inc., before commercial release. Some of this evaluation occurs concurrently with the evaluations described here.

Clones with characteristics that may be valuable for sugarcane breeding programs are identified throughout the selection process. Sugarcane geneticists in other programs often request clones from Canal Point. From May 1996 to April 1997, CP clones or seeds were requested from and sent to Argentina, Costa Rica, Egypt, El Salvador, France, Japan, Nicaragua, the Philippines, South Africa, and Taiwan. Maryland, Minnesota, Tennessee, and Texas and one other location in Florida also received Canal Point clones.

The purpose of this report is to summarize the performance of the clones in the plant-cane, first-ratoon, and second-ratoon stage IV experiments sampled in Florida's 1996–97 sugarcane harvest season.

TEST PROCEDURES

In 27 experiments, 42 new CP clones (11 clones of the CP 92 series in the plant crop, 10 clones of the CP 91 series in the plant and first-ratoon crops, 10 clones of the CP 90 series in the first- and second-ratoon crops, and 11 clones of the CP 89 series in the second-ratoon crop) were evaluated at 9 farms. Two additional new clones—CP 91–2246 at six farms and CP 91–1609 at one farm—were tested in the first-ratoon experiments with the CP 91 clones. Two additional new clones were also tested in the ratoon experiments with the CP 90 clones—CP 90–1428 at eight sites on organic soils and CP 90–1030 at two sites on sand soils.

CP 70–1133, the sixth most widely grown sugarcane cultivar in Florida in 1996 (Glaz 1996), was the reference clone in all 27 experiments. The plant-cane and second-ratoon experiments at A. Duda and Sons', Inc. (Duda), southeast of Belle Glade; the plant-cane (CP 92 series) and the first-ratoon (CP 90 series) experiments at Okeelanta Corporation (Okeelanta) south of South Bay; the second-ratoon experiment at Knight Management, Inc. (Knight), southwest of 20-Mile Bend; and the plant-cane experiment at Wedgworth Farms, Inc. (Wedgworth), east of Belle Glade, were all conducted on Dania muck soils. As described by McCollum et al. (1976), Dania is the shallowest of the organic soils in South Florida comprised primarily of decomposed sawgrass (*Cladium jamaicense* Crantz). The other organic soils

similar to Dania muck, listed in order of increasing depth, are Lauderhill, Pahokee, and Terra Ceia mucks.

Twelve experiments were conducted on Lauderhill mucks—all three experiments planted at New Hope Sugar Company (New Hope) east of Canal Point, the first-ratoon experiment planted at South Florida Industries near 20-Mile Bend in Palm Beach County, the plant-cane and first-ratoon experiments of the CP 91 series and second-ratoon experiments of the CP 89 and CP 90 series at Okeelanta, the plant-cane and first-ratoon experiments at Knight, and the first-ratoon experiments at Duda and Wedgworth.

The second-ratoon experiment at South Florida Industries was conducted on a Pahokee muck and the second-ratoon experiment at Wedgworth was conducted on a Terra Ceia muck. The two experiments at Eastgate Farms, Inc. (Eastgate), north of Belle Glade were on Torry muck, the two experiments at Hilliard Brothers' of Florida Ltd. (Hilliard) west of Clewiston were on Malabar sand, and the three experiments at Lykes Brothers' Farm (Lykes) near Moore Haven in Glades County were on Pompano fine sand.

The three experiments at Lykes and the CP 91 plant-cane, the CP 90 first-ratoon, and the CP 89 second-ratoon experiments at Okeelanta were planted on fields in successive sugarcane rotations. The other experiments were planted in fields that had been fallow for at least several months. In all second-ratoon experiments, clones were planted with two lines of seed cane per furrow in plots arranged in randomized complete block designs with four replications. Each plot was 10.7 m long and 6 m wide (0.0065 ha). In the plant-cane and first-ratoon experiments, plots were also arranged as randomized complete blocks, but plots were 10.7 m long and 3 m wide and there were eight, rather than four replications. For all experiments, the distance between rows was 1.5 meters, and 1.5-meter alleys separated the front and back ends of the plots. The margins of the experiments were protected with an extra row of sugarcane on each side (usually the same clone as planted in the adjacent plot) and an extra 1.5 meters of sugarcane in the front and back.

Before the clones were evaluated in stage IV, they were tested by artificial inoculation for susceptibility to sugarcane smut, sugarcane mosaic virus, leaf scald, ratoon stunt disease, and eye spot. Each clone was also rated for its reactions to natural infection by sugarcane smut, sugarcane rust, sugarcane mosaic virus, and leaf scald. After yield determinations were made, artificial-inoculation tests were repeated with pathogens of smut, ratoon stunt, mosaic, and leaf scald diseases. The farm management at each location controlled sugarcane management practices, such as fertilization, cultivation, and pest control.

Samples of 10 stalks per plot were cut from unburned cane from all plots in each experiment between October 9, 1996, and February 18, 1997. From the second-ratoon experiments, two samples per plot were obtained—one was cut from an outside row, the other from an inside row. From the plant-cane and first-ratoon experiments, one sample per plot was cut from the middle row of each plot. In addition, a preharvest sample was cut from two replications of nine plant-cane experiments between October 21 and October 29, 1996. For all samples, once a stool of sugarcane was chosen for cutting, the next 10 stalks in the row were cut as the 10-stalk sample. The range of sample dates for each crop was as follows: December 4, 1996, to February 18, 1997, for the plant crop; November 21, 1996, to January 16, 1997, for the first-ratoon crop; and October 9, 1996, to January 13, 1997, for the second-ratoon crop. After the stalk samples were transported to the Agricultural Research Service's laboratory at Canal Point for weighing and milling, crusher juice samples from the stalks were analyzed for Brix and sucrose, and theoretical recoverable yields of kg 96° sugar per metric ton of cane (KS/T) were determined as a measure of sugar production. The procedure used to calculate these yields using fiber percentages is described by Legendre (1992).

Total millable stalks per plot were counted between July 1 and September 12, 1996. Yields of metric tons of cane per hectare (TC/H) were calculated by multiplying stalk weights by number of stalks. Theoretical yields of metric tons of sugar per hectare (TS/H) were calculated by multiplying TC/H by KS/T and dividing by 1,000.

Analyses of variance were done using the procedures described by McIntosh (1983). F-ratios were chosen according to a mixed model, with treatments (clones) fixed and locations random. The source of variation that corresponded to the error term for the effect being tested was used to calculate the least significant difference (LSD). LSD was used regardless of significance of F-ratios in all analyses to protect against high type-II error rates, and significant differences were

sought at the 10-percent probability level (Glaz and Dean 1988).

Analyses of clonal stability across locations were done by using the procedures recommended in Shukla (1972). For each clone, the stability-variance parameter of Shukla was subsequently used to calculate (at the 1-percent probability level) a stability-safety index as described by Eskridge (1990). The mean yield of the clone and the stability of the clone across locations influence the value of this stability-safety index. The higher the stability-safety index, the more likely the clone is to have high yields at all locations.

RESULTS AND DISCUSSION

Table 1 lists the parentage, percent fiber, and reactions to smut, rust, leaf scald, and mosaic diseases for each clone included in these experiments. Tables 2–5 contain the results of the CP 92 plant-cane experiments, and tables 6–7 contain the results of this year's CP 91 plant-cane experiments. Tables 8–10 contain the results of the CP 91 first-ratoon experiments, and tables 11–12 contain the results of the CP 90 first-ratoon experiments. Tables 13–15 contain the results of the CP 90 second-ratoon experiments, and table 16 contains the results of the CP 89 second-ratoon experiment. Table 17 lists the dates that stalks were counted in each experiment.

Plant-Cane Crop, CP 92 Series

One new clone—CP 92–1435—when averaged across all six locations, yielded significantly more TC/H, KS/T, and TS/H than CP 70–1133 (tables 2, 4, and 5). The consistently high yields of CP 92–1435 across the six locations agree with its high stability-safety indices for TC/H and TS/H (tables 2 and 5). CP 92–1435 had a mean preharvest KS/T yield similar to that of CP 70–1133 (table 3).

Three other new clones—CP 92–1666, CP 92–1167, and CP 92–1641—had mean TS/H yields significantly higher than CP 70–1133 and similar to the mean TS/H yield of CP 92–1435 (table 5). CP 92–1666 and CP 92–1167 had high yields of TC/H (table 2) and had KS/T yields similar to the KS/T yield of CP 70–1133 (table 4). CP 92–1666 also had the highest stability index for TC/H due to its consistently high TC/H yields at all locations except Lykes (table 2). Conversely, the low stability-safety indices for TC/H and TS/H of CP 92–1167 were due to its high yields at all locations except Duda (tables 2 and 5). CP 92–1641 and CP 70–1133 had similar yields of TC/H (table 2), but CP 92–1641 yielded significantly more KS/T than all other clones (table 4). CP 92–1641 did not have outstanding yields of preharvest KS/T (table 3).

The fiber percentages of CP 92–1666, CP 92–1167, and CP 92–1641 are well within the normal commercial range for cultivars in Florida (table 1). However, with 11.28 percent fiber, CP 92–1435 has more fiber than most commercial cultivars used in Florida. CP 92–1666 is resistant to smut and leaf scald but has low levels of rust and mosaic. Each of the other three high-yielding CP 92 series clones has at least an intermediate susceptibility rating for at least one disease (table 1). CP 92–1435 and CP 92–1641 have intermediate susceptibility ratings for mosaic, and CP 92–1167 is susceptible to leaf scald and has an intermediate rating for rust. CP 92–1167 has one parent developed in Brazil (SP 70–1143), and CP 92–1641 has as a parent the most widely grown sugarcane cultivar in Florida (CP 80–1827) (Glaz 1996).

Plant-Cane Crop, CP 91 Series

Last year's report contained the results from seven locations of the CP 91 series from the plant-cane crop (Glaz et al. 1997). This year, results are available from three additional locations (tables 6–7). When averaged across all three locations, the TS/H yield of CP 70–1133 was significantly higher than the TS/H yields of all new clones except CP 91–1883 (table 7). CP 91–1883 and CP 70–1133 also had similar TS/H yields as plant cane last year (Glaz et al. 1997). CP 70–1133, by far, yielded significantly more TC/H and TS/H than any other clone at Hilliard and significantly more TS/H than all but two clones at Eastgate (table 7). CP 91–1914, the most promising clone from the plant-cane experiments last year (Glaz et al. 1997), had high preharvest and harvest KS/T yields (table 6) but mediocre TC/H and TS/H yields (table 7) this year.

First-Ratoon Crop, CP 91 Series

When yields of TC/H and TS/H for the CP 91 clones were averaged across all seven first-ratoon locations, no new clone yielded significantly greater TC/H or TS/H than CP 70–1133 (tables 8 and 10). CP 91–1924 yielded significantly more KS/T than all other clones, and CP 91–1062, CP 91–1238, CP 91–1914, and CP 91–1980 yielded significantly more KS/T than CP 70–1133 (table 9).

CP 91–1924 had unstable TC/H and TS/H yields; it had the lowest stability-safety index for TC/H and the second lowest for TS/H even though it had high mean yields of each (tables 8 and 10). Its TS/H yields were significantly greater than those of CP 70–1133 at New Hope, Duda, and Wedgworth; similar to those of CP 70–1133 at Knight, South Florida Industries, and Lykes; and significantly less than CP 70–1133 at Okeelanta. CP 91–1924 also had unstable yields last year, but the major reason for this instability was its extremely high yields at Okeelanta compared to mediocre yields at other locations. Thus, after 2 crop years, CP 91–1924 had unstable yields across crops and locations.

Although not significantly different, CP 91–1914 was the only clone to yield more TS/H than CP 70–1133 for the combined plant-cane and first-ratoon crops (data not shown). Last year as plant cane, CP 91–1914 yielded significantly more TC/H, KS/T, and TS/H than CP 70–1133 (Glaz et al. 1997). CP 91–1914 had unstable TC/H yields this year (table 8). At Knight and Lykes, CP 91–1914 had high TC/H yields. At Okeelanta, New Hope, and Duda, its TC/H yields were similar to those of CP 70–1133. At South Florida Industries and Wedgworth, its TC/H yields were significantly less than those of CP 70–1133. Rust infection of CP 91–1914 may explain some of the lower yields. However, at Knight CP 91–1914 had high yields and high levels of rust.

CP 91–2246 had promising yields last year as plant cane (Glaz et al. 1997). However, this year, its yields were not high. In addition, CP 91–2246 is too susceptible to leaf scald for commercial production in Florida and also is prone to rust (table 1). CP 91–1914 has intermediate susceptibility to smut and rust, and CP 91–1924 has intermediate susceptibility to leaf scald. CP 91–1914, CP 91–1924, and CP 91–2246 have acceptable fiber levels (table 1).

First-Ratoon Crop, CP 90 Series

Last year's report contained the results from seven locations of the CP 90 series from the first-ratoon crop (Glaz et al. 1997). This year, results are available from three additional first-ratoon experiments with these clones (tables 11–12).

CP 90–1436, CP 90–1464, and CP 90–1222 yielded significantly more TS/H than CP 70–1133 when averaged across all three locations (table 12). Of these three new clones, only CP 90–1436 had similarly high TS/H yields last year in the first-ratoon experiment (Glaz et al. 1997). This year, CP 90–1436, CP 90–1464, and CP 90–1222 had high TC/H yields, all substantially greater than the TC/H yield of CP 70–1133 but not significantly different from the TC/H yield of CP 70–1133 (table 12). CP 90–1464 yielded significantly more KS/T than CP 70–1133 and CP 90–1222 (table 11). CP 90–1222 and CP 90–1436 had KS/T yields similar to the KS/T yield of CP 70–1133.

Second-Ratoon Crop, CP 90 Series

When averaged across all seven locations, CP 90–1222 was the only clone in the second-ratoon crop that yielded significantly more TS/H than CP 70–1133 (table 15). CP 90–1222 yielded significantly more TS/H than CP 70–1133 at four locations—Duda, Okeelanta, South Florida Industries, and Wedgworth. The mean TC/H yield of CP 90–1222 across all seven locations was also significantly greater than that of CP 70–1133 and all other clones except CP 90–1549 (table 13). The KS/T yields of CP 70–1133 and CP 90–1222 were equal (table 14). CP 90–1222 had consistently high TS/H yields at all six locations with organic soils. However, its TC/H and TS/H yields on the sand soil at Lykes were low (tables 13 and 15). CP 90–1222 was the only clone in this group that yielded significantly more TS/H than CP 70–1133 when averaged across the plant-cane, first-ratoon, and second-ratoon crops at all seven locations (data not shown).

CP 90–1424 had high TC/H and TS/H yields on the sand soil at Lykes (tables 13 and 15). However, it did not have high TC/H or TS/H yields at Lykes as plant cane 2 years ago (Glaz et al. 1995) or as first-ratoon cane last year (Glaz et al. 1997).

All of the clones discussed in the CP 90 series—CP 90–1222, CP 90–1424, CP 90–1436, and CP 90–1464—whether as first- or second-ratoon cane, have acceptable fiber percentages, although the fibers of CP 90–1222 and CP 90–1424 are at the high end of the normal range (table 1). Each of these four clones also has at least one serious disease concern (table 1). CP 90–1222 has intermediate susceptibility to rust and leaf scald. CP 90–1424 has intermediate susceptibility to rust and low susceptibility to leaf scald. CP 90–1436 is too susceptible to rust and mosaic for commercial production in Florida and has intermediate susceptibility to leaf scald. CP 90–1464 has low susceptibil-

ity to rust and mosaic and intermediate susceptibility to smut and leaf scald.

Second-Ratoon Crop, CP 89 Series

No clone in this group yielded significantly more TS/H than CP 70–1133 (table 16). However, CP 89–2377 and CP 89–2143 had high TS/H yields, CP 89–2377 primarily due to its high TC/H yield and CP 89–2143 due to moderately high TC/H and KS/T yields (table 16). Both CP 89–2377 and CP 89–2143 have been released for commercial production in Florida based on their performance in previous experiments planted on fallow land (table 1). The data from the second-ratoon experiment, however, were collected from crops planted successively, indicating that both of these new cultivars also yield well from successive plantings. Both new cultivars have acceptable fiber levels (table 1). However, growers are cautioned to pay close attention to leaf scald, rust, and mosaic on CP 89–2143 and leaf scald, smut, and rust on CP 89–2377 (table 1).

SUMMARY

CP 92–1435 was the most promising clone in the CP 92 plant-cane experiments due to its high yields of KS/T, TC/H, and TS/H. It also had consistently high TC/H and TS/H yields at all six locations where it was tested. CP 92–1666, CP 92–1167, and CP 92–1641 also had high yields of TS/H.

This year, the CP 91 series was tested at three locations as plant cane and at seven locations as first-ratoon cane. CP 91–1914 was the only clone identified with high overall TS/H yields by combining this year's plant-cane and first-ratoon results with last year's plant-cane results from seven locations. CP 91–1150 had high TS/H yields on Pompano fine sand both as plant cane and first-ratoon cane. On Malabar sand, CP 91–1150 had higher TS/H yields than all other CP 91 clones, but these yields were lower than the TS/H yield of CP 70–1133.

This year, the CP 90 series was tested at three locations as first-ratoon cane and at seven locations as second-ratoon cane. As first-ratoon cane, CP 90–1436, CP 90–1464, and CP 90–1222 had high TS/H yields. However, as second-ratoon cane this year and for all plant-cane, first-ratoon, and second-ratoon tests conducted with these clones for the past 3 years, only CP 90–1222 had high TS/H yields.

This year, analysis of one second-ratoon experiment completed 4 years of testing of the CP 89 series. As in previous years, CP 89–2143 and CP 89–2377 had high yields this year.

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Table 1. Parentage, fiber content, and ratings of susceptibility to smut, rust, leaf scald, and mosaic for CP 70–1133 and 46 new sugarcane clones

		Rating*				
Clone	Parentage	Percent fiber	Smut	Rust	Leaf scald	Mosaic
CP 70–1133	67 P 6 CP 56–63†	10.37	R	I	L	R
CP 89–1268	CP 78 2114 x CP 78–1610	10.12	R	L	I	R
CP 89–1325	CP 80–1557 x CP 72–1210	10.40	R	R	L	R
CP 89–1331	CP 81–1238 x CP 72–2086	9.43	R	I	I	R
CP 89–1632	CP 73–1547 x CP 81–1254	9.62	R	I	L	R
CP 89–1643	CP 73–1547 x CP 81–1254	10.01	R	I	I	R
CP 89–1717	CP 81–2149 x CP 81–1238	9.13	R	L	I	R
CP 89–1756	86 P 30 CP 81–2149†	9.58	R	I	I	R
CP 89–1945	CP 72–2086 x CP 78–1610	10.03	R	R	I	R
CP 89–2143‡	CP 81–1254 x CP 72–2086	9.85	R	L	I	L
CP 89–2376	Unknown	10.19	R	L	I	I
CP 89–2377‡	Unknown	8.93	L	L	I	R
CP 90–1030	CP 76–331 x CP 81–1425	10.40	R	R	L	R
CP 90–1113	87 P 4 CP 80–1827†	9.85	R	I	S	R
CP 90–1151	87 P 4 CP 78–1247†	10.45	R	I	L	I
CP 90–1204	CP 82–2043 x CP 70–1133	10.90	R	I	I	R
CP 90–1222	87 P 9 CP 78–1247†	11.09	R	I	I	R
CP 90–1424	CP 78–1610 x CP 80–1827	10.96	R	I	L	R
CP 90–1428	CP 78–1610 x CP 80–1827	10.32	R	L	I	R
CP 90–1436	CP 81–332 x CP 78–1610	10.71	R	S	I	S
CP 90–1464	CP 81–1435 x CP 72–2086	10.57	I	L	I	L
CP 90–1510	CP 83–1770 x CP 83–1281	11.08	L	L	I	R
CP 90–1535	88 P 7 CP 81–1425†	9.91	R	R	L	R
CP 90–1549	CP 82–1592 x CP 84–1322	11.91	R	R	R	R
CP 91–1062§	88 P 9 CP 83–1281†	9.66	L	L	L	R
CP 91–1150§	88 P 7 CP 80–1827†	10.18	I	L	I	I
CP 91–1238	88 P 7 CP 70–1133†	8.79	R	S	R	R
CP 91–1560	CP 86–1791 x CP 82–2043	9.98	L	L	R	R
CP 91–1609	CP 83–1770 x CP 82–1505	9.83	R	R	R	R
CP 91–1865	88 P 17 CP 81–1425†	10.50	L	S	I	R
CP 91–1880	CP 82–2043 x CP 84–1322	10.57	R	L	L	R
CP 91–1883	CP 80–1827 x CP 84–1322	9.99	R	L	L	L
CP 91–1914	88 P 17 CP 80–1827†	9.88	I	I	L	R
CP 91–1924	CP 86–1791 x CP 81–2149	9.66	R	L	I	R
CP 91–1980	CP 62–374 x CP 84–1322	9.96	R	L	L	I
CP 91–2246	CP 77–1776 x CP 56–59	10.83	R	I	S	R
CP 92–1167§	CP 84–1591 x SP 70–1143	10.49	R	I	S	L
CP 92–1213§	CL 73–239 x CP 85–1498	9.72	S	L	R	R
CP 92–1320	89 P 5 CP 85–1211†	9.82	R	L	R	I
CP 92–1435§	CP 70–1133 x CP 72–2086	11.28	R	L	L	I
CP 92–1561	CP 82–2043 x CP 70–1133	10.50	R	L	R	L
CP 92–1607	CL 61–620 x CP 82–2043	8.65	R	L	L	I
CP 92–1640	CP 80–1827 x CP 84–1322	10.94	R	R	R	L
CP 92–1641§	CP 80–1827 x CP 84–1322	10.05	R	L	L	I
CP 92–1647§	CP 80–1827 x CP 84–1322	10.02	L	L	L	S
CP 92–1666§	CP 82–1592 x CP 84–1322	10.28	R	L	R	L
CP 92–1684§	CP 84–1714 x CP 80–1827	10.22	R	I	R	I

* R = resistant enough for commercial production; L = low levels of disease susceptibility; S = too susceptible for production; I = intermediate susceptibility (available data not sufficiently persuasive to determine susceptibility).

† 67 P 6 = 6th polycross made in 1967 crossing season. Female parent (CP 56–63) exposed to pollen from many clones; therefore, male parent of CP 70–1133 unknown. Similar explanations for CP 89–1756, CP 90–1113, CP 90–1151, CP 90–1222, CP 90–1535, CP 91–1062, CP 91–1150, CP 91–1238, CP 91–1865, CP 91–1914, and CP 92–1320.

‡ Released for commercial production in Florida.

§ Seed cane currently being increased by Florida Sugar Cane League, Inc., for potential release.

Table 2. Yields of cane (in metric tons per hectare—TC/H) from plant cane on Dania muck, Lauderhill muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date							
	Dania muck			Lauderhill muck		Pompano fine sand		
Clone	Okeelanta 1/27/97	Wedgworth 1/30/97	Duda 2/7/97	Knight 1/23/97	New Hope 2/18/97	Lykes Bros. 12/17/96	Stability-safety index*	Mean yield, all farms
CP 92–1666	171.21	153.90	189.34	168.51	219.19	54.79	–162.80	159.49
CP 92–1167	171.98	167.38	121.58	196.92	233.00	64.03	–203.29	159.15
CP 92–1435	170.80	158.51	153.26	172.71	194.86	73.25	–165.36	153.90
CP 92–1684	145.66	127.23	159.46	179.45	198.22	49.33	–173.46	143.23
CP 92–1213	153.08	132.93	169.21	165.19	190.79	35.02	–179.52	141.04
CP 92–1320	134.80	137.82	158.01	165.34	190.84	41.13	–177.45	137.99
CP 92–1641	134.46	125.17	154.78	153.49	183.75	61.87	–179.94	135.59
CP 70–1133	164.26	121.59	163.85	125.25	196.21	39.79	–203.01	135.16
CP 92–1607	131.90	136.11	128.82	150.24	196.96	59.52	–186.95	133.92
CP 92–1640	123.31	109.43	148.46	167.86	175.80	56.01	–195.84	130.14
CP 92–1647	125.15	122.96	130.34	128.88	194.32	41.04	–195.26	123.78
CP 92–1561	139.39	106.32	142.09	141.99	159.01	53.31	–200.29	123.68
Mean†	147.17	133.28	151.60	159.65	194.41	52.42	–185.26	139.76
LSD (p=0.1)	13.52	17.17	19.68	16.30	22.48	13.42		14.07
CV (%)‡	10.86	15.22	15.34	12.06	13.66	30.25		14.71

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter. To compare two negative indices, the index with the lowest absolute value is the greater of the two.

† LSD for location means = 6.97 TC/H at $p = 0.10$.

‡ CV = coefficient of variation.

Table 3. Preharvest theoretical recoverable yields of 96° sugar (in kilograms per metric ton of cane—KS/T) from plant cane on Dania muck, Lauderhill muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date							
	Dania muck			Lauderhill muck		Pompano fine sand		
Clone	Okeelanta 10/21/96	Wedgworth 10/29/99	Duda 10/29/96	Knight 10/28/96	New Hope 10/28/96	Lykes Bros. 10/22/96	Stability-safety index*	Mean yield, all farms
CP 92–1561	111.2	100.8	89.8	93.5	93.1	122.4	61.4	101.8
CP 70–1133	103.4	76.6	100.0	87.0	87.1	109.9	46.0	94.0
CP 92–1435	96.0	91.3	91.5	92.6	90.2	101.2	48.6	93.8
CP 92–1641	99.9	94.6	93.5	86.5	70.7	112.8	50.2	93.0
CP 92–1647	93.8	90.0	96.5	73.3	77.6	121.7	46.5	92.1
CP 92–1213	95.7	86.3	83.9	80.9	79.1	114.4	52.9	90.0
CP 92–1640	92.6	82.0	82.3	81.4	83.7	106.5	49.8	88.1
CP 92–1320	73.8	84.0	85.4	78.5	78.8	122.2	37.3	87.1
CP 92–1607	86.2	77.2	83.6	79.2	78.6	115.6	46.9	86.7
CP 92–1666	87.9	76.3	93.5	81.0	65.9	108.9	41.0	85.6
CP 92–1167	82.0	90.6	81.9	78.9	68.9	102.2	42.6	84.1
CP 92–1684	88.5	86.8	49.4	86.9	76.8	100.4	17.4	81.4
Mean†	92.6	86.3	85.9	83.3	79.2	111.5	45.0	89.8
LSD (p=0.1)	15.2	11.6	13.6	9.4	17.5	26.8		7.6
CV (%)‡	9.2	7.5	8.8	6.3	19.5	13.4		10.3

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter.
† LSD for location means = 4.5 KS/T at $p = 0.10$.
‡ CV = coefficient of variation.

Table 4. Theoretical recoverable yields of 96° sugar (in kilograms per metric ton of cane—KS/T) from plant cane on Dania muck, Lauderhill muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date							
	Dania muck			Lauderhill muck		Pompano fine sand		
Clone	Okeelanta 1/27/97	Wedgworth 1/30/97	Duda 2/7/97	Knight 1/23/97	New Hope 2/18/97	Lykes Bros. 12/17/96	Stability-safety index*	Mean yield, all farms
CP 92–1641	114.0	115.5	117.4	118.3	116.8	134.8	49.0	119.5
CP 92–1647	112.0	108.4	113.3	112.5	111.7	134.5	47.6	115.4
CP 92–1435	109.2	107.5	102.6	110.1	114.2	131.0	45.3	112.4
CP 92–1561	111.0	105.7	109.1	107.4	106.0	131.7	44.1	111.8
CP 92–1213	108.5	103.6	105.3	108.5	103.4	129.2	42.9	109.7
CP 92–1666	111.2	102.8	102.3	104.3	99.8	130.9	38.8	108.5
CP 92–1640	110.4	103.1	99.2	100.9	102.1	134.0	37.1	108.3
CP 92–1684	109.8	105.4	85.0	107.2	110.9	127.4	22.9	107.6
CP 92–1607	108.2	98.7	94.4	106.4	105.9	131.8	37.6	107.6
CP 70–1133	100.8	98.5	97.1	109.8	107.8	129.3	36.1	107.2
CP 92–1320	104.4	103.0	100.8	106.5	104.6	122.4	39.8	106.9
CP 92–1167	105.8	101.6	103.0	99.5	105.5	122.5	37.2	106.3
Mean†	108.8	104.5	102.5	107.6	107.4	129.9	39.9	110.1
LSD (p=0.1)	6.0	5.5	5.9	3.6	6.2	6.4		3.9
CV (%)‡	6.5	6.2	6.7	3.9	6.8	5.8		6.1

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter.
† LSD for location means = 2.7 KS/T at $p = 0.10$.
‡ CV = coefficient of variation.

Table 5. Theoretical recoverable yields of 96° sugar (in metric tons per hectare—TS/H) from plant cane on Dania muck, Lauderhill muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date							
	Dania muck			Lauderhill muck		Pompano fine sand		
Clone	Okeelanta 1/27/97	Wedgworth 1/30/97	Duda 2/7/97	Knight 1/23/97	New Hope 2/18/97	Lykes Bros. 12/17/96	Stability-safety index*	Mean yield, all farms
CP 92–1435	18.555	16.967	15.625	19.127	22.257	9.451	–14.332	16.997
CP 92–1666	19.018	15.844	19.330	17.559	21.790	7.024	–15.363	16.761
CP 92–1167	18.201	17.034	12.528	19.648	24.533	7.777	–18.378	16.620
CP 92–1641	15.366	14.535	18.211	18.154	21.521	8.289	–15.366	16.013
CP 92–1684	16.081	13.403	13.558	19.206	21.939	6.258	–16.922	15.074
CP 92–1213	16.649	13.790	17.825	17.918	19.692	4.531	–17.407	15.068
CP 92–1320	14.040	14.182	15.961	17.592	20.007	5.036	–16.922	14.470
CP 70–1133	16.588	11.996	15.964	13.759	21.143	5.177	–18.431	14.105
CP 92–1607	14.275	13.465	12.121	15.989	20.919	7.814	–18.220	14.097
CP 92–1647	14.046	13.324	14.742	14.534	21.729	5.488	–17.604	13.977
CP 70–1640	13.617	11.275	14.824	16.916	17.848	7.461	–18.580	13.657
CP 92–1561	15.487	11.282	15.449	15.250	16.811	7.034	–19.120	13.552
Mean†	15.994	13.925	15.512	17.138	20.849	6.778	–17.220	15.032
LSD (p=0.1)	1.870	1.999	2.235	1.967	2.710	1.641		1.528
CV (%)‡	13.820	16.962	17.025	13.567	15.361	28.620	28.620	16.489

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter. To compare two negative indices, the index with the lowest absolute value is the greater of the two.

† LSD for location means = 0.798 TS/H at $p = 0.10$.

‡ CV = coefficient of variation.

Table 6. Preharvest and harvest yields of theoretical recoverable 96° sugar (in kilograms per metric ton of cane—KS/T) from plant cane on Lauderhill muck, Torry muck, and Malabar sand

	Preharvest yield by soil type, farm, and sampling date				Harvest yield by soil type, farm, and sampling date			
	Lauderhill muck	Torry muck	Malabar sand		Lauderhill muck	Torry muck	Malabar sand	
Clone	Okeelanta 10/21/96	Eastgate 10/22/96	Hilliard 10/22/96	Mean yield, all farms	Okeelanta 12/9/96	Eastgate 2/11/97	Hilliard 12/4/96	Mean yield, all farms
CP 91–1924	115.1	115.5	121.8	117.4	120.9	124.6	132.9	126.1
CP 91–1914	119.9	106.3	118.0	114.7	113.9	119.5	140.6	124.7
CP 91–1062	95.5	102.5	120.1	106.0	114.6	115.9	143.1	124.5
CP 91–2246	108.0	102.6	123.7	111.4	111.9	112.9	146.5	123.8
CP 91–1980	97.5	99.3	120.2	105.7	112.9	118.2	139.5	123.5
CP 91–1150	103.9	122.6	118.5	115.0	112.1	111.2	146.5	123.3
CP 91–1238	112.2	96.4	114.6	107.7	114.3	114.8	139.0	122.7
CP 91–1883	101.3	110.2	112.0	107.8	106.2	121.0	138.0	121.7
CP 91–1865	106.2	90.1	116.9	104.4	112.1	108.1	141.7	120.6
CP 91–1880	104.0	101.8	116.2	107.3	109.1	115.0	136.5	120.2
CP 70–1133	111.5	99.8	122.5	111.2	101.7	119.7	138.8	120.1
CP 91–1560		95.9	114.4	105.1		108.2	142.6	125.4
Mean*	106.8	103.6	118.2	109.6	111.8	115.7	140.5	123.0
LSD (p=0.1)	6.0	14.4	19.8	9.6	6.1	8.8	4.4	7.2
CV (%)†	3.1	7.7	9.3	7.0	6.5	9.2	3.8	6.6

* LSD's for location means at p = 0.10 are 5.0 KS/T for the preharvest yields and 3.4 KS/T for the harvest samples.

† CV = coefficient of variation.

Table 7. Yields of cane and of theoretical recoverable 96° sugar (in metric tons per hectare—TC/H and TS/H) from plant cane on Lauderhill muck, Torry muck, and Malabar sand

	Cane yield by soil type, farm, and sampling date				Sugar yield by soil type, farm, and sampling date			
	Lauderhill muck	Torry muck	Malabar sand		Lauderhill muck	Torry muck	Malabar sand	
Clone	Okeelanta 11/29/96	Eastgate 2/11/97	Hilliard 12/4/96	Mean yield, all farms	Okeelanta 12/9/96	Eastgate 2/11/97	Hilliard 12/4/96	Mean yield, all farms
CP 70–1133	146.88	257.83	136.23	180.31	14.938	30.825	18.888	21.550
CP 91–1883	118.91	249.34	89.34	152.53	12.725	30.188	12.338	18.417
CP 91–1150	139.09	203.86	101.93	148.29	15.587	22.525	14.887	17.666
CP 91–1238	112.29	245.75	70.01	142.68	12.775	28.350	9.725	16.950
CP 91–1914	133.34	189.05	92.53	138.30	15.200	22.638	13.000	16.946
CP 91–1062	88.54	227.59	83.15	133.09	10.113	26.150	11.913	16.059
CP 91–2246	120.74	190.20	89.93	133.62	13.450	21.425	13.200	16.025
CP 91–1980	101.60	208.26	84.18	131.35	11.462	24.625	11.663	15.917
CP 91–1924	117.80	151.86	89.79	119.82	14.275	19.000	11.937	15.071
CP 91–1865	113.94	197.13	63.66	124.91	12.750	21.487	9.037	14.425
CP 91–1880	88.81	202.38	65.08	118.75	9.700	23.162	8.900	13.921
CP 91–1560		210.12	78.59	144.36		22.825	11.088	16.957
Mean*	116.54	211.11	87.03	138.85	12.998	24.433	12.215	16.650
LSD (p=0.1)	14.08	34.28	18.13	28.50	1.796	4.509	2.513	3.646
CV (%)†	14.51	19.51	25.02	21.23	16.600	22.170	24.720	23.439

* LSD for location means of cane yield = 13.52 TC/H and of sugar yield = 1.527 TS/H.
† CV = coefficient of variation.

Table 8. Yields of cane (in metric tons per hectare—TC/H) from first-ratoon cane on Lauderhill muck and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Lauderhill muck						Pompano fine sand		
Clone	Okeelanta 11/29/96	New Hope 12/2/96	Duda 12/19/96	Knight 12/23/96	S. Fla. Ind. 12/30/96	Wedg-worth 1/16/97	Lykes Bros. 11/27/96	Stability-safety index*	Mean yield, all farms
CP 91–1914	130.52	152.10	136.15	156.76	145.23	125.06	88.47	–68.76	133.47
CP 91–1924	97.22	155.01	177.19	127.20	145.47	162.19	68.29	–78.92	133.22
CP 70–1133	125.20	141.86	146.67	124.76	173.41	150.69	69.27	–55.72	133.12
CP 91–1560	105.69	138.66	155.91	143.33	158.30	127.71	76.41	–49.34	129.43
CP 91–1865	117.68	132.90	153.50	129.80	152.31	133.35	65.21	–50.15	126.39
CP 91–1238	90.79	135.19	153.30	127.18	178.81	116.28	83.18	–76.67	126.39
CP 91–1150	117.35	165.53	138.84	103.34	139.35	123.50	87.90	–75.16	125.12
CP 91–1980	118.70	160.72	148.92	110.37	125.13	119.64	76.96	–74.97	122.92
CP 91–1062	100.27	133.64	137.29	135.74	146.28	111.09	86.08	–64.47	121.48
CP 91–1880	101.57	142.57	155.55	99.87	149.92	127.80	71.45	–61.65	121.25
CP 91–1883	98.90	108.73	134.45	115.15	148.14	114.22	70.54	–70.57	112.88
CP 91–2246	116.30	146.08	131.25	119.12	141.19		68.89		120.47
CP 91–1609						147.25			147.25
Mean†	110.02	142.75	147.42	124.38	150.30	129.90	76.05	–66.03	125.83
LSD (p=0.1)	12.24	18.98	22.25	19.87	21.06	16.89	14.57		12.06
CV (%)‡	13.37	15.98	18.13	19.19	16.83	15.62	23.01		17.46

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter. To compare two negative indices, the index with the lowest absolute value is the greater of the two.

† LSD for location means = 10.66 TC/H at $p = 0.10$.

‡ CV = coefficient of variation.

Table 9. Theoretical recoverable yields of 96° sugar (in kilograms per metric ton of cane—KS/T) from first-ratoon cane on Lauderhill muck and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Lauderhill muck						Pompano fine sand		
Clone	Okeelanta 11/29/96	New Hope 12/2/96	Duda 12/19/96	Knight 12/23/96	S. Fla. Ind. 12/30/96	Wedg-worth 1/16/97	Lykes Bros. 11/27/96	Stability-safety index*	Mean yield, all farms
CP 91–1924	130.5	128.5	128.8	123.2	128.3	124.5	121.8	101.2	126.5
CP 91–1062	126.9	129.2	124.0	118.4	128.4	118.0	119.7	91.6	123.5
CP 91–1238	125.6	126.3	123.8	119.6	119.7	121.3	120.4	102.1	122.4
CP 91–1914	124.8	125.5	124.0	120.7	117.7	114.1	121.0	102.3	121.1
CP 91–1880	120.8	120.7	124.8	121.1	118.3	119.9	119.2	99.2	120.7
CP 91–1980	119.7	120.9	122.5	121.3	118.9	112.5	122.3	98.4	119.7
CP 91–1560	116.2	120.2	122.9	121.1	117.8	113.2	121.8	94.5	119.0
CP 91–1865	121.3	121.0	121.1	117.8	110.0	120.9	117.9	86.9	118.6
CP 91–1150	118.6	121.7	118.7	123.1	118.5	106.5	122.2	83.8	118.5
CP 70–1133	119.8	122.4	118.2	117.6	109.8	111.4	120.8	90.3	117.1
CP 91–1883	117.8	117.0	119.5	113.6	112.7	114.3	118.7	96.1	116.2
CP 91–2246	124.3	121.9	126.5	116.4	122.3		115.7		121.2
CP 91–1609						115.4			115.4
Mean†	122.2	122.9	122.9	119.5	118.5	116.0	120.1	95.1	120.3
LSD (p=0.1)	5.3	6.0	4.2	5.7	5.9	6.3	8.0		2.8
CV (%)‡	5.2	5.9	4.1	5.7	6.0	6.6	8.1		6.0

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter.
† LSD for location means = 3.0 KS/T at $p = 0.10$.
‡ CV = coefficient of variation.

Table 10. Theoretical recoverable yields of 96° sugar (in metric tons per hectare—TS/H) from first-ratoon cane on Lauderhill muck and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Lauderhill muck						Pompano fine sand		
Clone	Okeelanta 11/29/96	New Hope 12/2/96	Duda 12/19/96	Knight 12/23/96	S. Fla. Ind. 12/30/96	Wedg-worth 1/16/97	Lykes Bros. 11/27/96	Stability-safety index*	Mean yield, all farms
CP 91–1924	12.695	19.809	22.830	15.771	18.664	20.160	8.314	–9.712	16.892
CP 91–1914	16.257	19.050	16.879	18.878	17.150	14.289	10.714	–8.674	16.174
CP 70–1133	15.002	17.312	17.359	14.678	19.070	16.748	8.423	–6.226	15.513
CP 91–1238	11.378	17.018	19.088	15.275	21.470	14.155	10.122	–8.673	15.501
CP 91–1560	12.257	16.586	19.196	17.546	18.618	14.492	9.401	–7.043	15.442
CP 91–1062	12.734	17.234	17.030	16.041	18.721	13.142	10.306	–7.077	15.030
CP 91–1865	14.180	16.083	18.563	15.364	16.657	16.286	7.659	–6.885	14.970
CP 91–1150	14.000	20.109	16.452	12.507	16.404	13.181	10.746	–9.825	14.771
CP 91–1980	14.220	19.437	18.232	13.344	14.905	13.403	9.485	–8.811	14.718
CP 91–1880	12.242	17.170	19.429	12.083	17.781	15.336	8.670	–7.566	14.673
CP 91–1883	11.643	12.638	16.052	13.068	16.605	13.114	8.417	–9.317	13.077
CP 91–2246	14.558	17.794	16.586	13.995	17.187		8.096	–7.199	15.037
CP 91–1609						17.042			14.703
Mean†	13.431	17.520	18.141	14.879	17.769	15.112	9.196	–8.164	15.150
LSD (p=0.1)	1.626	2.404	2.799	2.588	2.551	2.205	1.893		1.486
CV (%)‡	14.546	16.484	18.267	20.899	17.253	17.534	24.737	22.136	18.457

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter. To compare two negative indices, the index with the lowest absolute value is the greater of the two.

† LSD for location means = 1.344 TS/H at $p = 0.10$.

‡ CV = coefficient of variation.

Table 11. Theoretical recoverable yields of 96° sugar (in kilograms per metric ton of cane—KS/T) from first-ratoon cane on Dania muck, Torry muck, and Malabar sand

	Mean yield by soil type, farm, and sampling date			
	Dania muck	Torry muck	Malabar sand	
Clone	Okeelanta 12/9/96	Eastgate 12/9/96	Hilliard 11/21/96	Mean yield, all farms
CP 90–1535	110.8	128.1	132.5	123.8
CP 90–1464	118.7	123.3	128.9	123.6
CP 90–1510	118.2	123.0	125.5	122.2
CP 90–1436	118.0	122.3	125.3	121.9
CP 90–1113	121.3	120.8	122.8	121.6
CP 90–1204	117.6	120.3	125.0	120.9
CP 90–1151	113.8	124.3	123.7	120.6
CP 90–1424	123.7	118.3	116.5	119.5
CP 90–1222	116.5	119.4	119.3	118.4
CP 70–1133	112.2	113.4	124.9	116.8
CP 90–1549	115.4	114.9	119.3	116.5
CP 90–1428	112.2	107.4		109.8
CP 90–1030			126.4	126.4
Mean*	116.5	119.6	124.2	120.1
LSD (p=0.1)	10.2	4.7	7.9	5.2
CV (%)†	7.3	4.7	7.7	6.0

* LSD for location means = 6.8 KS/T at p = 0.10.
† CV = coefficient of variation.

Table 12. Yields of cane and of theoretical recoverable 96° sugar (in metric tons per hectare—TC/H and TS/H) from first-ratoon cane on Dania muck, Torry muck, and Malabar sand

Clone	Cane yield by soil type, farm, and sampling date				Sugar yield by soil type, farm, and sampling date			
	Dania muck	Torry muck	Malabar sand		Dania muck	Torry muck	Malabar sand	
	Okeelanta 12/9/96	Eastgate 12/9/96	Hilliard 11/21/96	Mean yield, all farms	Okeelanta 12/9/96	Eastgate 12/9/96	Hilliard 11/21/96	Mean yield, all farms
CP 90–1436	128.65	149.44	94.69	124.26	15.143	18.272	11.949	15.121
CP 90–1464	86.69	184.61	90.55	120.61	10.255	22.710	11.617	14.861
CP 90–1222	111.61	169.41	95.47	125.50	12.965	20.270	11.319	14.851
CP 90–1535	109.83	149.61	82.85	114.09	12.352	19.344	10.905	14.200
CP 90–1549	110.29	150.22	2.95	121.15	12.762	17.340	12.294	14.132
CP 90–1424	95.51	158.16	76.04	109.90	11.706	18.707	8.736	13.050
CP 70–1133	71.87	140.58	94.03	102.16	8.093	15.964	11.097	11.718
CP 90–1204	72.75	139.12	78.10	96.66	8.597	16.664	9.706	11.656
CP 90–1510	43.68	140.23	88.54	90.82	5.179	17.252	11.126	11.186
CP 90–1151	61.25	124.25	82.00	89.17	6.960	15.455	10.146	10.854
CP 90–1113	40.68	105.87	44.16	63.57	4.948	12.865	5.373	7.729
CP 90–1428	107.58	165.13		136.35	12.125	17.780		14.953
CP 90–1030			93.39	93.39			11.826	11.826
Mean*	86.70	148.05	85.23	106.66	10.090	17.719	10.508	12.772
LSD (p=0.1)	28.76	30.25	19.21	24.33	3.613	3.751	2.677	2.966
CV (%)†	27.65	17.32	19.10	22.820	29.840	17.938	21.447	23.586

* LSD for location means of cane yield = 13.67 TC/H and of sugar yield = 1.663 TS/H.
† CV = coefficient of variation.

Table 13. Yields of cane (in metric tons per hectare—TC/H) from second-ratoon cane on Dania muck, Lauderhill muck, Pahokee muck, Terra Ceia muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck		Lauderhill muck		Pahokee muck	Terra Ceia muck	Pompano fine sand		
Clone	Knight 10/29/96	Duda 10/31/96	New Hope 10/9/96	Okeelanta 10/21/96	S. Fla. Ind. 10/15/96	Wedg-worth 1/13/97	Lykes 11/13/96	Stability-safety index*	Mean yield, all farms
CP 90–1222	185.35	164.56	79.36	116.80	88.52	138.79	63.82	–144.31	119.60
CP 90–1549	176.16	138.54	75.18	83.46	67.64	130.35	74.28	–133.84	106.52
CP 90–1424	150.49	126.88	67.37	88.75	83.41	106.57	108.33	–144.43	104.54
CP 70–1133	143.12	112.68	69.31	91.57	64.10	120.48	80.74	–141.12	97.43
CP 90–1204	162.93	133.41	51.15	89.78	60.03	116.25	64.65	–141.49	96.88
CP 90–1436	163.59	120.30	77.48	78.21	67.95	108.94	55.42	–154.47	95.98
CP 90–1464	166.37	147.05	50.43	98.44	6.38	127.97	70.91	–196.14	95.36
CP 90–1151	143.61	115.06	55.11	78.06	48.64	105.19	76.88	–140.15	88.94
CP 90–1535	145.99	116.76	50.06	60.18	49.45	104.36	85.82	–149.70	87.52
CP 90–1113	112.32	93.20	28.91	44.79	14.22	65.23	67.36	–180.77	60.86
CP 90–1510	67.78	100.71	28.24	49.94	24.36	54.34	80.78	–239.29	58.02
CP 90–1428	168.72	146.37	74.20	85.64	70.70	121.01			111.11
CP 90–1030							61.64		61.64
Mean†	148.87	126.29	58.90	80.47	53.78	108.29	74.22	–160.52	92.97
LSD (p=0.1)	29.18	20.08	12.37	14.46	16.42	16.40	18.26		14.29
CV (%)‡	15.83	12.90	18.32	21.64	22.72	14.04	23.20		18.40

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter. To compare two negative indices, the index with the lowest absolute value is the greater of the two.

† LSD for location means = 9.97 TC/H at $p = 0.10$.

‡ CV = coefficient of variation.

Table 14. Theoretical recoverable yields of 96° sugar (in kilograms per metric ton of cane—KS/T) from second-ratoon cane on Dania muck, Lauderhill muck, Pahokee muck, Terra Ceia muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck		Lauderhill muck		Pahokee muck	Terra Ceia muck	Pompano fine sand		
Clone	Knight 10/29/96	Duda 10/31/96	New Hope 10/9/96	Okeelanta 10/21/96	S. Fla. Ind. 10/15/96	Wedg-worth 1/13/97	Lykes 11/13/96	Stability-safety index*	Mean yield, all farms
CP 90–1535	110.1	108.9	136.5	122.5	132.7	124.3	119.8	43.1	122.1
CP 90–1113	106.8	103.3	132.0	113.5	134.0	124.2	128.6	36.5	120.3
CP 90–1424	105.4	100.4	128.5	110.8	137.8	116.8	119.6	37.7	117.0
CP 90–1464	105.0	102.5	131.6	117.9	127.4	118.2	113.8	37.4	116.6
CP 90–1151	106.6	99.5	128.5	114.2	132.2	122.9	107.5	36.4	115.9
CP 90–1436	105.2	100.7	131.6	115.3	128.8	116.9	110.5	37.4	115.6
CP 70–1133	109.2	102.0	122.2	107.8	131.2	107.3	111.3	28.3	113.0
CP 90–1222	99.7	91.9	123.7	111.8	137.3	110.9	115.6	29.4	113.0
CP 90–1204	98.5	97.4	127.5	110.5	134.1	120.1	100.5	27.7	112.6
CP 90–1510	100.4	93.1	123.6	109.3	126.1	109.3	114.3	32.0	110.9
CP 90–1549	94.3	88.5	114.0	102.2	123.5	118.2	98.6	21.5	105.6
CP 90–1428	100.0	97.4	122.4	109.5	124.8	109.4			110.6
CP 90–1030							115.1		115.1
Mean†	103.4	98.8	126.8	112.1	130.8	116.5	112.9	33.4	114.5
LSD (p=0.1)	5.0	5.2	8.0	6.1	5.5	3.7	11.2		3.8
CV (%)‡	5.2	4.9	7.1	5.1	4.6	3.7	11.1		6.5

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter.

† LSD for location means = 3.8 KS/T at $p = 0.10$.

‡ CV = coefficient of variation.

Table 15. Theoretical recoverable yields of 96° sugar (in metric tons per hectare—TS/H) from second-ratoon cane on Dania muck, Lauderhill muck, Pahokee muck, Terra Ceia muck, and Pompano fine sand

	Mean yield by soil type, farm, and sampling date								
	Dania muck		Lauderhill muck		Pahokee muck	Terra Ceia muck	Pompano fine sand		
Clone	Knight 10/29/96	Duda 10/31/96	New Hope 10/9/96	Okeelanta 10/21/96	S. Fla. Ind. 10/15/96	Wedg-worth 1/13/97	Lykes 11/13/96	Stability-safety index*	Mean yield, all farms
CP 90–1222	18.437	15.072	9.804	13.067	12.219	15.392	7.410	–11.537	13.057
CP 90–1424	15.858	12.767	8.716	9.808	11.496	12.436	12.987	–12.066	12.010
CP 90–1549	16.481	12.258	8.567	8.568	8.336	15.359	7.457	–11.014	11.004
CP 90–1436	17.296	12.120	10.262	9.032	8.760	12.732	6.153	–12.845	10.908
CP 70–1133	15.678	11.505	8.450	9.932	8.422	12.890	9.084	–9.533	10.852
CP 90–1464	17.432	15.094	6.623	11.596	0.808	15.153	8.108	–20.024	10.688
CP 90–1204	16.089	12.992	6.491	9.969	8.023	13.989	7.055	–10.683	10.658
CP 90–1535	16.030	12.720	6.718	7.386	6.390	12.961	10.406	–10.823	10.373
CP 90–1151	15.323	11.506	7.150	8.910	6.435	12.931	8.734	–9.721	10.141
CP 90–1113	12.016	9.627	3.875	5.102	1.897	8.088	8.727	–15.963	7.047
CP 90–1510	6.839	9.365	3.530	5.473	3.099	5.925	9.276	–22.356	6.215
CP 90–1428	16.899	14.283	9.067	9.430	8.764	13.226			11.945
CP 90–1030							7.084		7.084
Mean†	15.365	12.442	7.438	9.023	7.054	12.590	8.540	–13.324	11.088
LSD (p=0.1)	3.057	2.015	1.574	1.703	2.106	1.824	2.335		1.730
CV (%)‡	16.295	15.186	20.301	23.635	25.064	14.978	25.201		19.952

* Stability-safety index for each clone is calculated at $p = 0.01$ by Eskridge's method and use of Shukla's stability-variance parameter. To compare two negative indices, the index with the lowest absolute value is the greater of the two.

† LSD for location means = 1.316 TS/H at $p = 0.10$.

‡ CV = coefficient of variation.

Table 16. Yields of cane and sugar from the second-ratoon harvest of successively planted sugarcane on Lauderhill muck planted at Okeelanta Corporation and sampled on December 26, 1996

Clone	Yield of cane—TCH (metric tons per hectare)	Yield of 96° sugar—KS/T (kg per metric ton of cane)	Yield of 96° sugar—TS/H (metric tons per hectare)
CP 89–2377	70.26	116.2	8.139
CP 89–2143	65.43	122.0	8.044
CP 89–1331	62.19	128.9	8.025
CP 89–2376	65.04	122.9	7.997
CP 70–1133	58.04	121.4	7.183
CP 89–1268	58.35	120.4	7.018
CP 89–1325	54.77	122.0	6.695
CP 89–1717	50.55	129.8	6.567
CP 89–1632	44.05	125.3	5.554
CP 89–1945	41.33	113.9	4.715
CP 89–1756	31.43	117.0	3.680
CP 89–1643	28.32	118.5	3.340
Mean	52.48	121.5	6.413
LSD (p=0.1)	11.00	5.7	1.475
CV (%)*	22.26	8.2	25.475

* CV = coefficient of variation

Table 17. Dates of stalk counts at 9 plant-cane, 10 first-ratoon, and 8 second-ratoon experiments

	Crop		
Location	Plant cane	First ratoon	Second ratoon
Duda	7/22/96	7/23/96	8/23/96
Eastgate	7/1/96	8/1/96	—
Hilliard	9/12/96	7/4/96	—
Knight	7/16/96	7/19/96	7/16/96
Lykes	9/11/96	9/9/96	9/12/96
New Hope	7/3/96	7/30/96	7/31/96
Okeelanta	7/12/96	7/10/96	8/7/96
Okeelanta (successive)	7/11/96	8/9/96	8/8/96
S. Fl. Ind.	—	7/25/96	7/29/96
Wedgworth	7/15/96	8/5/96	8/6/96